Department of Economics
University of Toronto

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October 30, 2015

ECO 209Y
MACROECONOMIC THEORY AND POLICY

SOLUTIONS

Term Test #1

LAST NAME _____

FIRST NAME _____

STUDENT NUMBER _____

Indicate your section of the course:

☐ **Tuesday, 10-12 – L0101**

☐ **Tuesday, 2-4 – L0201**

☐ **Wednesday, 2-4 – L0301**

☐ **Thursday, 2-4 – L0401**

INSTRUCTIONS:

1. The total time for this test is 1 hour and 45 minutes.
2. Aids allowed: a simple, non-programmable calculator.
3. Use pen instead of pencil.

DO NOT WRITE IN THIS SPACE

Part I	_____/30	Part III	1. _____/10
Part II	_____/20		2. _____/10
			3. _____/10
TOTAL	_____/80		

PART I (30 marks)

Instructions:

- Enter your answer to each question in the table below.
- Each correct answer is worth 3 marks. ***Note that a deduction of 0.5 mark will be made for each incorrect answer.*** Table cells left blank will receive a zero mark (i.e., no deduction).
- **Do NOT guess your answers!**

1	2	3	4	5	6	7	8	9	10
A	C	D	B	E	C	E	B	D	A

Correct: _____ **Incorrect:** _____ **Blank:** _____

1. If investment exceeds private saving by $22 billion and government spending exceeds tax revenues by $34 billion, then

A) the trade deficit is $56 billion.
B) the trade surplus is $56 billion.
C) the trade deficit is $12 billion.
D) the trade surplus is $12 billion.
E) we cannot say anything about the international trade balance.

2. Suppose exports receipts are 115, imports payments are 110, income from assets receipts are 20, income from assets payments are 30, and net gifts and grants are nil. Which of the following is true?

A) There is a Current Account surplus and GDP is greater than GNP.
B) There is a Current Account surplus and GDP is less than GNP.
C) There is a Current Account deficit and GDP is greater than GNP.
D) There is a Current Account deficit and GDP is less than GNP.
E) The Current Account is balanced and GDP is greater than GNP.

3. Consider a hypothetical closed economy with a tax rate (t) equal to 0.25 and an aggregate expenditure multiplier (α_{AE}) equal to 2.5. If the tax rate is reduced to 0.15, the aggregate expenditure multiplier would now be equal to

A) 2.175.
B) 3.175.
C) 5.125.
D) 3.125.
E) 4.125.

Use this space for rough work.

The information in the following table describes a hypothetical economy, where prices are expressed in dollars and quantities in units. Use this data to answer questions 4 and 5 below.

	2013		2014	
	Price	**Quantity**	**Price**	**Quantity**
Good A	4	50	5	40
Good B	9	40	9	50
Good C	9	10	10	8

4. Using the chain method, real GDP _____ by approximately _____ percent in 2014.

A) increased; 2.4.
B) increased; 3.8.
C) increased; 3.1.
D) decreased; 2.2.
E) decreased; 3.9.

5. Taking 2013 as the base period, according to the GDP deflator the annual rate of inflation was approximately _____ percent in 2014.

A) -7.1.
B) 6.5.
C) -5.9.
D) 7.5.
E) 7.0.

6. Suppose that the value of Canada's aggregate expenditure multiplier is 3 (i.e., $\alpha_{AE} = 3$). The Canadian government buys a house in Mexico City for its ambassador to Mexico at a cost of $2,000,000. Which of the following best describes the likely outcome of this transaction on the Canadian economy?

A) Investment increases by $2,000,000 and GDP rises by $6,000,000.
B) Government spending increases by $2,000,000 and GDP rises by $6,000,000.
C) Government spending increases by $2,000,000 but GDP does not change.
D) Investment increases by $2,000,000 but GDP does not change.
E) Government spending and investment increase each by $2,000,000 and GDP rises by $12,000,000.

Use this space for rough work.

7. Consider a closed economy with a fixed price-level and a balanced government budget at the initial equilibrium. A drop in government purchases will cause

A) business inventories to rise and a government budget surplus, but no change in consumption.
B) both consumption and business inventories to fall, but no change in the government budget balance.
C) both consumption and business inventories to fall, and a government budget surplus.
D) a government budget surplus but no change in either consumption or business inventories.
E) consumption to fall, business inventories to rise, and a government budget surplus.

8. Data recently released by Statistic Canada indicates that the unemployment rate edged up from 7.0 percent to 7.1 percent in September (*The Globe and Mail*, 09 Oct 2015). Which of the following explains this outcome?

A) Employment fell while the labour force remained basically unchanged.
B) Employment expanded but the labour force grew much faster.
C) Both employment and the labour force contracted.
D) Employment remained basically unchanged while the labour force expanded.
E) While full-time jobs increased, part-time jobs decreased at a greater pace.

9. The incoming Liberal government is proposing an increase in infrastructure spending. Which of the following might best describe the likely outcome of such policy?

A) Both current income and government deficit will rise but potential income will remain unchanged.
B) Both current income and potential income will rise but government deficit will remain unchanged.
C) Current income will rise but both potential income and government deficit will remain unchanged.
D) Current income, potential income, and government deficit will all rise.
E) Both current income and government deficit will rise but potential income will fall.

10. Which of the following would cause the IS curve to shift outwards?

A) A decrease in autonomous imports.
B) A decrease in autonomous investment.
C) A decrease in the rate of interest.
D) An increase in autonomous private savings.
E) Both C) and D) are correct.

Use this space for rough work.

PART II (20 marks)

Consider the following economy:

$C = 100 + 0.9YD$
$I = 400 - 20i$
$G = 300$
$TR = 200$
$TA = 0.2Y$
$NX = 100 - 0.12Y$
$Y_{fe} = 2500$

a) What is the equation for the *AE* curve in this economy? *Show <u>all</u> your work.* **(2 marks)**

$AE = C + I + G + NX$
$= (100 + 0.9\ YD) + (400 - 20\ i) + 300 + (100 - 0.12\ Y)$
where $YD = Y + TR - TA = Y + 200 - 0.2\ Y = 200 + 0.8\ Y$
$= [100 + 0.9\ (200 + 0.8\ Y)] + (400 - 20\ i) + 300 + (100 - 0.12\ Y)$
$= (280 + 0.72\ Y) + (400 - 20\ i) + 300 + (100 - 0.12\ Y$
$= 1080 - 20\ i + 0.6\ Y$

b) If $i = 6$, what is the level of equilibrium income (Y^*) in this economy? **(2 marks)** *Show <u>all</u> your work.*

At $i = 6$, the corresponding *AE* curve is:
$AE = 1080 - 20\ (6) + 0.6\ Y = 1080 - 120 + 0.6\ Y = 960 + 0.6\ Y$

In equilibrium, $Y = AE$

$Y = 960 + 0.6\ Y \rightarrow 0.4\ Y = 960 \rightarrow Y = 2400$

c) What is the value of the marginal propensity to consume out of income (MPC_Y)? What is the value of the marginal propensity to import (m)? What is the value of the marginal propensity to spend (z)? What is the size of the aggregate expenditure multiplier (α_{AE})? **(4 marks)** *Show all your work.*

Since $YD = 200 + 0.8\ Y$ from a) above, C as a function of Y is:
$C = 100 + 0.9\ (200 + 0.8\ Y) = 280 + 0.72\ Y$
and thus $MPC_Y = 0.72$

The marginal propensity to import is the slope of the NX function, i.e., $m = 0.12$.

The marginal propensity to spend (z) is the slope of the AE curve and it's equal to the difference between the MPC_Y and the marginal propensity to import (m):
$z = MPC_Y - m = 0.72 - 0.12 = 0.6$

And the aggregate expenditure multiplier (α_{AE}) is:
α_{AE} = 1 / (1 – slope of AE curve) = 1 / (1 – 0.6) = 1 / 0.4 = 2.5

d) What is the level of private saving (S) when the economy is in equilibrium? **(2 marks)** What is the level of national saving (NS) when the economy is in equilibrium? **(2 marks)** *Show all your work.*

$S = YD - C$
and since $YD = Y + TR - TA = Y + 200 - 0.2\ Y = 200 + 0.8\ Y$ and $Y^* = 2400$, then
$YD = 200 + 0.8\ (2400) = 200 + 1920 = 2120$.
And $C = 100 + 0.9\ YD = 100 + 0.9\ (2120) = 100 + 1908 = 2008$.

Therefore, $S = YD - C = 2120 - 2008 = 112$.

National saving (NS) is the summation of private saving (S) and public saving, where public saving is the government budget surplus (BS).

The government budget surplus is:
$BS = TA - (G + TR)$
$= 0.2\ Y - (300 + 200)$
$= 0.2\ Y - 500$
$= 0.2\ (2400) - 500$
$= 480 - 500$
$= -20$.

Therefore, $NS = S + BS = 112 - 20 = 92$

e) If the government decides to implement expansionary fiscal policy to move the economy to full employment (Y_{fe}), by how much should it increase its purchases of goods and services (G)? **(2 marks)** What will be the size of the government budget surplus (BS) now? **(2 marks)** *Show all your work.*

Since $Y_{fe} = 2500$, Y must increase by 100 (i.e., $\Delta Y = 100$).
Therefore, since $\Delta Y = \alpha_{AE} \Delta G$,
$\Delta G = (1/\alpha_{AE}) \Delta Y = (1/2.5)\ 100 = 40$

The government budget surplus changes because both government spending and government revenues change:
$\Delta BS = \Delta TA - \Delta G$, where $\Delta TA = t \Delta Y = 0.2\ (100) = 20$
Therefore, $\Delta BS = 20 - 40 = -20$
and the new budget surplus will be $BS = -40$

f) Go back to the equilibrium of part b) above. If the government decides to achieve full employment (Y_{fe}) by changing the rate of interest (i), at what level should it set the rate of interest? **(2 marks)** What will be the size of the government budget surplus (BS) now? **(2 marks)** *Show all your work.*

The change in i should cause investment to increase by 40, i.e., $\Delta I = 40$.
And since $I = 400 - 20i$,
$\Delta I = -20\ \Delta i \rightarrow 40 = -20\ \Delta i \rightarrow \Delta i = -40/20 = -2$
Therefore, the rate of interest should be set at $i = 4$

In this case, the government budget surplus changes because government revenues change:
$\Delta BS = \Delta TA = t \Delta Y = 0.2\ (100) = 20$
Therefore, the new budget surplus will be $BS = 0$

PART III (30 marks)

Instructions: Answer the following three questions in the space provided. You may continue your answers on pages 11-12 if additional space is required (***but clearly indicate that your answer continues on page 11 or 12***). Each question is worth 10 marks.

1. Critically comment on the following statement: *"When the economy is booming, government expenditure must be cut in order to reduce demand and inflationary pressure. When the economy is tanking, government expenditure must also be cut in order to reduce the government deficit and restore the confidence of the private sector."*

There are two parts to this statement. Let's start by analyzing the first part, when the economy is booming. If the economy is booming and there is inflationary pressure, then it might make sense to implement ***contractionary fiscal policy*** — a reduction in government expenditure (G) or an increase in taxes (TA). The decision whether to decrease G or increase TA should depend on the situation of the government budget surplus (BS). If $BS > 0$, then a decrease in G might be advisable. But if $BS < 0$, then an increase in TA would also make sense. ***Therefore, a decrease in G will not necessarily be always the best policy option when the economy is booming.***

Let's analyze now the second part of the statement, when the economy is in a recession. If the economy is in recession, this means that current Y is less than potential Y — i.e., there is excess capacity and high unemployment in the economy. In a recession, the government might probably be running a budget deficit (BD).The reason for the economy to be producing below its potential is that demand (i.e., AE) is not strong enough. Therefore, we need an exogenous increase in AE, i.e., an increase in $\overline{AE}$. In other words, we need that at least one of the components of $\overline{AE}$ increase. If we assume a closed economy for simplicity, we need an increase in $\overline{C}$, $\overline{I}$ or $\overline{G}$ to trigger an increase in $\overline{AE}$ and restore Y to its full employment level.

For $\overline{C}$ and $\overline{I}$ to increase, indeed the confidence of the private sector must first be restored. But will a decrease in $\overline{G}$ and the BD be sufficient to restore the confidence of the private sector? It appears unlikely that a reduction in BD will improve private sector confidence. In the first place, the BD is not responsible for the recession; rather, the causation seems to go in the opposite direction: the government is running a BD because of the recession. If government deficits in countries like Canada, the U.S. or Japan were responsible for the lack of private sector confidence, then these governments would not be able to continue borrowing at historically low rates as in the present. In the second place, what will be the likely impact of reducing BD by decreasing $\overline{G}$? A decrease in $\overline{G}$ will cause the economy to move into an even deeper recession, further reducing the confidence of both consumers and the business sector.

The confidence of the private sector must indeed be restored to move the economy to full employment Y, but this confidence will start to be restored when there are some clear signs that employment and income are on the rise again — and for this to happen $\overline{AE}$ must increase and not decrease! Therefore, what the government should do is to increase $\overline{G}$ rather than decreasing it. An increase in $\overline{G}$ will contribute, first, to prevent the level of economic activity from dropping even lower and, second, to start restoring confidence in the economy and creating the conditions for further expansion. But, of course, an increase in $\overline{G}$ will not by itself move the economy to full employment. The economy will move to full employment as a result of both C and I recovering their previous levels and beyond. But the latter requires consumer and business confidence to be restored, and this will not happen by itself. It needs something to trigger this change, and this something is the initial increase in Y and employment resulting from expansionary fiscal policy. ***Therefore, a decrease in G will make matters worse when the economy is in a recession.***

(Continue on pages 11-12 if necessary)

2. Critically comment on the following statement: *"In a closed economy, national saving is equal to actual investment. Therefore, the government should implement policies that encourage greater saving to help the economy get out of a recession."* (Show your answer with the help of a diagram and explain the economics.)

This statement is incorrect.

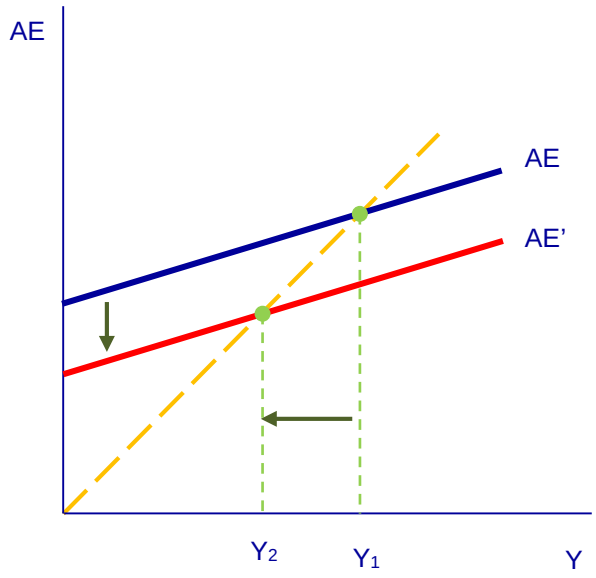
Investment plays a very important economic role in the ***long run*** — it increases the capital stock of the country and thus it contributes to increasing the productive capacity of the economy. Therefore, there exists a general consensus among economists that high rates of investment are desirable and necessary for an economy to grow rapidly.

Since, by definition, saving is always equal to ***actual*** investment and high rates of investment are desirable, are high rates of saving also desirable?

Our *AE* model applies to the ***short run*** and thus it's unable to properly address the role of investment in the process of economic growth. Nonetheless, the *AE* model provides us with some important insights to answer the question regarding the desirability of high rates of saving. In this model, ***planned*** or ***desired*** investment expenditure plays a role in the ***short run*** as part of overall aggregate expenditure — i.e., just like planned consumption expenditure, it contributes to create a demand for domestically produced goods. Therefore, ***when there exists excess capacity in the economy***, higher ***planned*** investment is also desirable in the short run because it increases *AE* and thus equilibrium income.

However, higher ***planned*** investment does not depend on higher saving as some economists seem to suggest. Rather, the causation is the other way around: all else equal, higher planned investment determines higher saving. Indeed, higher planned saving implies lower planned consumption expenditure and, therefore, lower *AE*. In turn, lower *AE* results in involuntary accumulation of inventories and thus in higher ***actual*** investment. But there is nothing desirable in higher actual investment as a result of an involuntary accumulation of inventory since it ends up reducing output and income.

The above result is shown in the diagram on the right. Initially the economy is in equilibrium at the level of income Y_1. An increase in planned or desired saving causes desired consumption expenditure to decrease and the *AE* curve shifts down to *AE'*. A situation of excess supply arises in the economy and output and income start to fall towards the new equilibrium at Y_2.

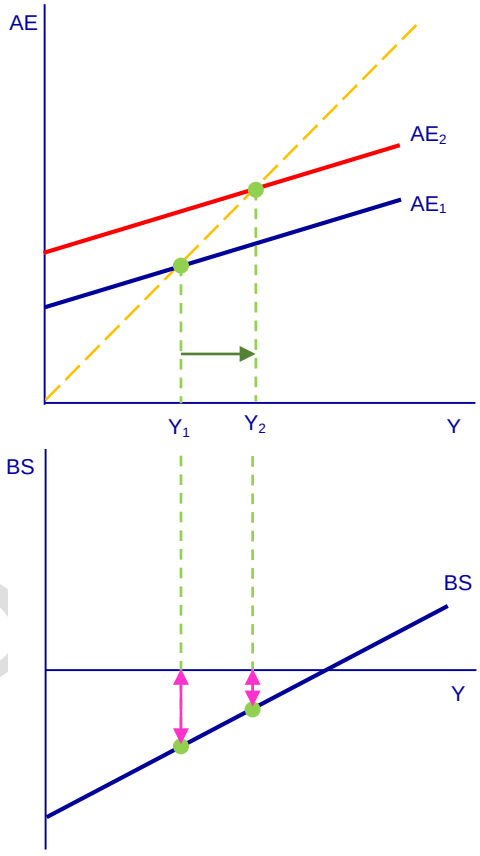


The claim that planned saving is desirable because it determines planned investment is thus a ***fallacy*** — it does not. Moreover, the causation goes in the opposite direction — higher planned investment results in higher levels of planned saving. Indeed, an increase in ***planned investment*** raises the level of equilibrium income and, therefore, causes the levels of both ***planned consumption*** and ***planned saving*** to rise.

(Continue on pages 11-12 if necessary)

3. Critically comment on the following statement: *"If the government increases income taxes on the rich while reducing (by the same amount) income taxes on the middle class, both equilibrium income and the government budget deficit will remain unchanged."* (Show your answer with the help of a diagram and explain the economics.)

Let's examine first the impact that this policy may have on equilibrium income. For equilibrium income to change, autonomous aggregate expenditure ($\overline{AE}$) must change first. Indeed, the change in equilibrium income will be equal to: $\Delta Y = \alpha_{AE}\, \Delta\overline{AE}$.



What is the effect of this policy on $\overline{AE}$?

On the one hand, the increase in income taxes on the rich reduces their disposable income (YD) and thus the consumption expenditure of the rich decreases. This has a contractionary effect on the economy. Indeed, at each level of Y the consumption expenditure of the rich (C_r) decreases by the reduction in their YD times their MPC_{YD}, i.e., $\Delta C_r = c_r\, \Delta YD_r$, where c_r is the MPC_{YD} of the rich and ΔYD_r is the decrease in the YD of the rich. Therefore, overall AE decreases at each level of Y by this amount, i.e., the AE curve shifts down by $c_r\, \Delta YD_r$.

On the other hand, the decrease in income taxes on the middle class increases their disposable income (YD) and thus the consumption expenditure of the middle class rises. This has an expansionary effect on the economy. Indeed, at each level of Y the consumption expenditure of the middle class (C_m) increase by the increase in their YD times their MPC_{YD}, i.e., $\Delta C_m = c_m\, \Delta YD_m$, where c_m is the MPC_{YD} of the middle class and ΔYD_m is the decrease in the YD of the middle class. Therefore, overall AE increases at each level of Y by this amount, i.e., the AE curve shifts up by $c_m\, \Delta YD_m$.

What is the total effect on AE? First, note that $\Delta YD_r = \Delta YD_m$ by assumption since the increase in income tax on the rich is equal to the decrease in income tax on the middle class. Second, note that the MPC_{YD} decreases as the level of YD increases, and thus $c_r < c_m$. Therefore, the increase in AE due to the greater consumption expenditure of the middle class is larger in absolute value than the decrease in AE resulting from the contraction in the consumption expenditure of the rich and thus overall AE increases. Consequently, equilibrium Y does not remain unchanged — it increases (as shown in the upper diagram above).

What is the effect of this policy on the government budget deficit (BD)?

At the initial level of equilibrium Y the BD does not change since the higher income taxes paid by the rich equal the lower income taxes paid by the middle class. But since equilibrium Y increases as a result of this policy, government revenues rise while government expenditures remain unchanged — and thus the BD decreases (or the BS increases). This is shown in the lower diagram above.

Therefore, the statement is incorrect — as a result of this government policy the level of equilibrium Y increases while the BD decreases.

(Continue on pages 11-12 if necessary)

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